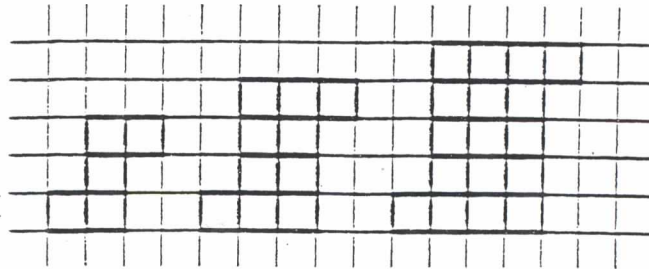


This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

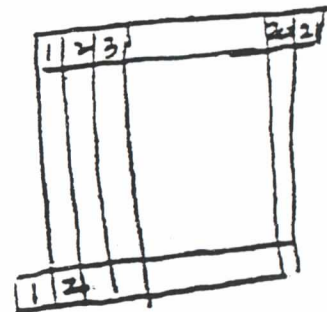
9. The first 3 figures in a pattern of tiles are shown below. The pattern of tiles contains 50 figures.



Describe the 20th figure in this pattern, including the total number of tiles it contains and how they are arranged. Then explain the reasoning that you used to determine this information. Write a description that could be used to define any figure in the pattern.

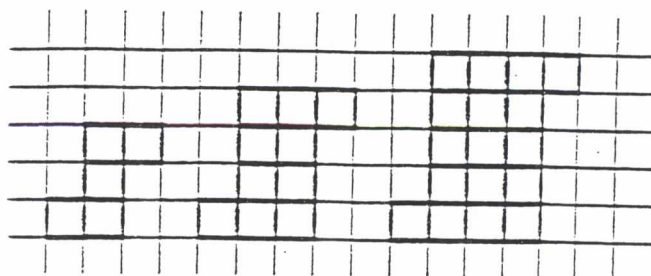
Handwritten notes showing a sequence of numbers arranged in a grid-like pattern, likely representing the number of tiles in each row and column for the 20th figure:

1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20
11	12	13	14	15	16	17	18	19	20	21
12	13	14	15	16	17	18	19	20	21	22
13	14	15	16	17	18	19	20	21	22	23
14	15	16	17	18	19	20	21	22	23	24
15	16	17	18	19	20	21	22	23	24	25
16	17	18	19	20	21	22	23	24	25	26
17	18	19	20	21	22	23	24	25	26	27
18	19	20	21	22	23	24	25	26	27	28
19	20	21	22	23	24	25	26	27	28	29
20	21	22	23	24	25	26	27	28	29	30



This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

9. The first 3 figures in a pattern of tiles are shown below. The pattern of tiles contains 50 figures.



Describe the 20th figure in this pattern, including the total number of tiles it contains and how they are arranged. Then explain the reasoning that you used to determine this information. Write a description that could be used to define any figure in the pattern.

total tiles : 441  
arranged :  $20 \times 22$

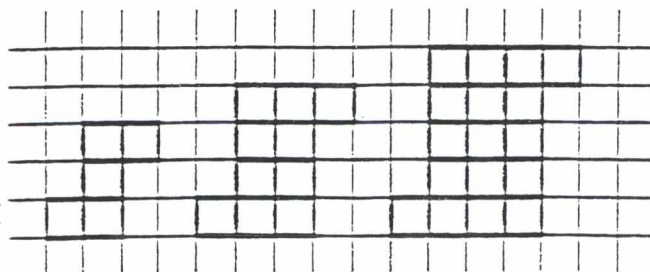
tile	num tiles	Arranged
#1	$1^2 + 1 = 5$	$1 \times 3$
#2	$2^2 + 1 = 9$	$2 \times 4$
#3	$3^2 + 1 = 17$	$3 \times 5$
#4	$4^2 + 1 = 26$	$4 \times 6$
...		
#20	$21^2 + 1 = 442$	$20 \times 22$

Formula

$$(\text{FigNum} + 1)^2 + 1 = \text{Num tiles}$$

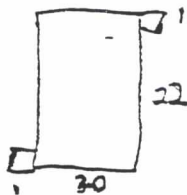
This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

9. The first 3 figures in a pattern of tiles are shown below. The pattern of tiles contains 50 figures.



Describe the 20th figure in this pattern, including the total number of tiles it contains and how they are arranged. Then explain the reasoning that you used to determine this information. Write a description that could be used to define any figure in the pattern.

22



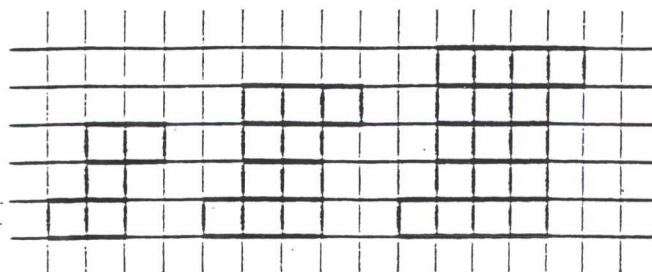
442 tiles

- The ~~#~~ of tiles on the height is 2 more than the ~~#~~ of figure you are on. The ~~#~~ of tiles in the width is the same as the ~~#~~ of figure you are on. Multiply these 2 then add on the extra 2 to get 442.

M

This question requires you to show your work and explain your reasoning. You may use drawings, words, and numbers in your explanation. Your answer should be clear enough so that another person could read it and understand your thinking. It is important that you show all your work.

9. The first 3 figures in a pattern of tiles are shown below. The pattern of tiles contains 50 figures.



Describe the 20th figure in this pattern, including the total number of tiles it contains and how they are arranged. Then explain the reasoning that you used to determine this information. Write a description that could be used to define any figure in the pattern.

The middle rows have the number of tiles that that diagram is in the pattern. Top and bottom rows have one more tile each. Each diagram has six more tiles than the last.

## Extend Pattern of Tiles Scoring Guide

Minimal: Attempts to draw or describe the given pattern or an additional figure in the pattern.

Partial: Illustrates or describes at least one additional figures in the pattern correctly or states there are 442 tiles in the 20th figure.

Satisfactory: The 20th figure is described and the number of tiles is given. Some evidence of reasoning must be present. Reasoning is sound but there may be a computation error. Explanation may lack some clarity.

Extended: The 20th figure is described correctly, including the fact that there are 442 tiles; clear explanation; evidence of accurate generalization (not necessarily symbolic), based on inductive reasoning.

Incorrect: The work is completely incorrect, irrelevant, or off task.

## Extend Pattern of Tiles Performance Data NAEP 1992, 1996

grade 12	Percent Responding					
	Minimal	Partial	Satisfactory	Extended	Incorrect	OMIT
1992	24	11	3	2	36	23
1996	28	18	2	2	29	20